

**What is claimed is:**

1. A method of detecting defects in a patterning device in a photolithographic process comprising:

printing a reference pattern on a reference substrate using the patterning device;

printing a pattern for manufacture of a device on a production substrate different from said reference substrate using the patterning device;

printing a test pattern on a test substrate using the patterning device; and

comparing the printed test pattern to the printed reference pattern to detect a defect in the patterning device.

2. A method of detecting defects in a patterning device according to claim 1, wherein the reference substrate is a silicon wafer.

3. A method of detecting defects in a patterning device according to claim 1, wherein the reference substrate is a silicon wafer having an SiO<sub>2</sub> layer and the printed reference pattern is etched into the SiO<sub>2</sub> layer.

4. A method of detecting defects in a patterning device according to claim 1, wherein the test substrate is the reference substrate.

5. A method of detecting defects in a patterning device according to claim 1, wherein the printed test pattern is a pattern in developed resist.

6. A method of detecting defects in a patterning device according to claim 1, wherein the reference pattern is printed at a plurality of different locations on the reference substrate.

7. A method of detecting defects in a patterning device according to claim 6, wherein individual printed reference patterns are spaced such that an individual test pattern can be printed beside each individual printed reference pattern.

8. A method of detecting defects in a patterning device according to claim 1, wherein in comparing the printed test pattern to the printed reference pattern the patterned test substrate and reference substrate are scanned by at least one optical defect inspection tool.

9. A method of detecting defects in a patterning device according to claim 8, wherein in comparing the printed test pattern to the printed reference pattern the patterned test

substrate and reference substrate are scanned simultaneously by respective optical defect inspection tools.

10. A method of detecting defects in a patterning device according to claim 8, wherein multiple comparisons take place between multiple printed reference patterns and multiple printed test patterns.

11. A method of detecting defects in a patterning device according to claim 10, wherein majority voting determines location of the defect in the patterning device.

12. A method of detecting defects in a patterning device according to claim 1, wherein said patterning device is a photolithography mask.

13. An inspection system comprising:  
an inspection tool for inspecting first and second patterns; and  
a device for comparing said first and second patterns.

14. An inspection system according to claim 13, wherein said inspection tool for inspecting first and second patterns comprises two inspection tools capable of inspecting said first and second patterns simultaneously.

15. A computer program comprising program code for instructing a lithographic projection apparatus to use a patterning device to print a reference pattern on a reference substrate and, at a later time, to use said patterning device to print a test pattern on the same reference substrate.

16. A computer program comprising program code for instructing an inspection system to inspect first and second patterns and to compare said first and second patterns.

17. A reference substrate comprising a substrate having thereon a durable printed reference image of a pattern of a patterning device and no further patterned layers above said reference image.

18. A reference substrate according to claim 17, wherein said printed reference image has been formed by etching into a layer of SiO<sub>2</sub> on the substrate.

19. A reference substrate according to claim 17, wherein the pattern is printed at a number of different locations on the reference substrate.

20. A reference substrate according to claim 19, wherein the individual printed patterns are spaced such that an individual test pattern can be printed beside each individual printed reference pattern.

21. A method of detecting defects in a patterning device of a photolithographic apparatus, the method comprising:

generating a reference pattern on a first substrate using a projection beam of radiation and the patterning device;

generating a pattern on a second substrate using the projection beam of radiation and the patterning device; and

comparing the reference pattern on the first substrate to the pattern on the second substrate to detect a defect in the patterning device.

22. A method of detecting defects in a patterning device according to claim 21, wherein the pattern is a test pattern and the second substrate is a test substrate.

23. A method of detecting defects in a patterning device according to claim 21, wherein the pattern is a test pattern and the second substrate is the first substrate.

24. A method of detecting defects in a patterning device according to claim 21, wherein the pattern comprises features of a manufactured device and the second substrate comprises the manufactured device.